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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/282,772 03/31/99 TANUMA

S 0941.63006

EXAMINER

024978
GREER, BURNS & CRAIN
300 S WACKER DR
25TH FLOOR
CHICAGO IL 60606

MM91/0822

01.2

ART UNIT

PAPER NUMBER

2871

DATE MAILED:

08/22/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/282,772	TANUMA ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-5 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 16) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> . | 20) <input type="checkbox"/> Other: |

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DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The following is a quotation of 35 U.S.C. 103 (a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Applicant admitted prior art in view of US 6,201,588 (Walton et al).

Claim 1, Applicant admitted prior art discloses (the “background of the invention” in the specification, especially col.2, line 19 - col.3, line 32 and Figs. 2A and 2B) that the conventional liquid crystal display device comprising:

- a first substrate (10);
- a second substrate (12),
- a liquid crystal layer (14) interposed between the first and second substrates (10 and 12);
- a group of electrodes such as a pair of electrodes (11a and 11b) disposed on the first substrate (10) (In-plane mode) so as to create an electric field in the liquid crystal layer general parallel to the first substrate in an activated state in which a drive voltage is applied to the pair of electrodes;

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- when the drive voltage is not applied to the electrodes (11a and 11b) (in a non-active state), the liquid crystal molecules (16) are aligned generally perpendicular to the plane of the first substrate(10),
- when the drive voltage is applied to the electrodes (11a and 11b) (in a active state), the liquid crystal molecules are aligned generally parallel to the plane of the first substrate, i.e., aligned in the direction of the electric field inside the liquid crystal layer in the activated state (see the Fig. 2B for the symmetrical middle area).

Applicant admitted prior art does not expressly disclose that the liquid crystal molecules having a pre-tilt angle of less than 90° .

However, Walton discloses (col.1, lines 19-21; col.7, lines 38-44) that it is very well known to provide a rubbed alignment layer to control the alignment and the pretilt angle of adjacent liquid crystal molecules in a liquid crystal layer, and it is preferable in the homeotropic liquid crystal cells that the pretilt angle of liquid crystal molecules be in the range from equal to or greater than 80° to less than 90° , so that to obtain a high display quality.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to have a pre-tilt angle of less than 90° as claimed in claim 1 for achieving a high display quality.

3. Claims 2-3 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Applicant admitted prior art and Walton as applied to claim 1 above, and further in view of US 5,907,380 (Lien).

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Claims 2-3, Lien discloses (col.5, lines 56-62; Figs.5 and 6) that the electrode wall (62) produce a lateral electric field that combines with the lateral electric field from the edges of the pixel electrode (26) defining the LC cell to cause the LC molecules to tilt in a desired direction when a voltage is applied across the pixel, and the electrode wall (62) is formed on the first substrate (22) and is formed on the second substrate (24). Therefore, the principle of the electrode wall (62) is the same as the first projection is formed on the first electrode (e.g., pixel electrode) and the second projection is formed on the second electrode (e.g., common electrode), and also the third projection is formed on the second substrate, so as to control the LC molecules tilt angle in a desired direction. Walton also indicates that by providing such tilt control, conventional rubbing steps associated with alignment layers can be avoided.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made that the liquid crystal display device includes a first projection on the first electrode and a second projection on the second electrode, and third projection on the second substrate as claimed in claims 2-3 to control the tilt angle in a desired direction and avoiding such rubbing steps.

Allowable Subject Matter

4. Claim 4 are allowable over the prior art of record.

The prior art of record neither teaches nor disclose a liquid crystal display device comprising various elements as claimed, more specifically, as the following:

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the liquid crystal layer having a birefringence large about 0.10 but smaller than about 0.25 [claim 4].


The closest reference US 6,177,973 (Lee et al) discloses (col.1, lines 6-10) that using an electrical control birefringence (ECB) to improve a response speed, but does not disclose the birefringence range as claimed in claim 4.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (703)308-6213 .

Mike Qi
August 10, 2001


William L. Sikes
Supervisory Patent Examiner
Technology Center 2800